WHITE PAPER

ACCELERATING PLUG IN VEHICLE DEPLOYMENT IN MISSOURI

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The Opportunity:

The State of Missouri has an opportunity that will help create a long term, sustainable growth economy by aggressively developing a robust environment to accelerate the deployment of plug in electric vehicles across the state. Many other states and communities across the US are actively preparing for plug in vehicles and as a result are early on the list of deployments planned by automakers. These other areas will receive the economic and environmental benefits of plug in vehicles before Missouri does. The State of Missouri has the opportunity to increase our competitive standing by creating an environment supportive of plug in vehicles. This will include accelerated development of charging infrastructure, public education, and deployment of plug in vehicles both in government and private fleets as well as in consumer adoption. The State of Missouri can augment the existing efforts already underway by the Greater Kansas City and Greater St. Louis Plug-In Readiness Task Forces.

By doing this we help with creation of jobs, attract educated young people to Missouri, and help create an economy of innovation with green tech components. This is a national priority in which Missouri can participate while at the same time help its own economy.

The Benefits:

Why would Missouri want to encourage and accelerate the deployment of plug in vehicles in the state? Simply stated…..economic development, jobs, environmental improvement, and energy security.

From an economic development perspective, plug in vehicles are an entirely new segment of the transportation industry which will help:

- *Create Jobs*. This will create new jobs in the area for electricians to install charging stations, sales/marketing to sell charging stations and plug in vehicles, as well as training and new jobs for auto technicians that are required to work on the vehicles. Entrepreneurs always spring up when new markets are created, potentially including upfitters to add electric drive components to existing gasoline vehicles.
- *Attract Businesses and Professionals*. Creating a green transportation infrastructure helps improve quality of life and provide green amenities in Missouri to help attract the businesses, professionals, and students necessary to create and sustain a high growth sustainable economy. Decisions on where business locate are now starting to consider an area's demonstrated commitment to sustainability.

- *Develop Green Tech and Innovative Growth.* This is a building block in the effort to create a state economy that incorporates green technology to help drive a sustainable, innovation economy.
- *Improve Economic Competitiveness*. Missouri's economic competitiveness with other areas can be enhanced via enablement of transportation electrification.
- *Leverage existing businesses.* Missouri already has a strong set of players in the Transportation electrification space. Smith Electric Vehicles (large electric trucks) and Dow Kokam (batteries) , and LilyPad EV (electric vehicle charging stations). Movement in this direction leverages progress to date.

From an environmental perspective, driving using electricity is cleaner than driving using petroleum. Even in Missouri, where around 80% of electricity is generated using coal, the increased efficiency of the electric motor as compared to a gasoline engine, results in decreased CO2, particulates and Nitrogen and Sulfur compounds. A mile driven in an average car using a gasoline generates about a pound of CO2, while a mile driving in an average electric vehicle uses about half a pound. As more renewables come on line, the comparison gets even better. St. Louis is currently out of Air Quality Attainment, and Kansas City and other area may be out of attainment if/when the EPA changes its standards. Encouraging use of plug in vehicles is helpful tool in the effort to reach attainment.

From an energy security perspective, using electricity as a transportation fuel help reduce our dependence on oil for our transportation needs. We can use coal, solar, wind, nuclear, hydro, or other fuels we deem appropriate in Missouri.

Validation:

Transportation Electrification is a national priority that has very broad support and actions. It helps us reduce our Green House Gas emissions, reduces our dependence on foreign oil, helps create new jobs, and helps stimulate the economy. Governments, manufacturers, communities and consumers are all engaged in this effort. According to Pike Research 1 Million charging stations will be deployed in the US by 2015, and Verify Markets estimates the charging station industry will reach $3.09B by 2017. Many different sectors, as described below are very involved.

The Federal Government is exhibiting strong leadership to develop this industry. It has provided $3.4B of stimulus money to enhance this industry, has set a goal of 1M plug in vehicles on the road by 2015, is providing a 50% tax credit on installation of charging infrastructure (through the end of 2010, may get extended), is providing $7500 tax credit for those who purchase plug in vehicles, and is setting targets for deployment of plug in vehicles in its own fleets. The federal government is partnering with charging station manufactures to accelerate deployment of charging stations in select areas.

State and Local Governments are aggressively creating plug in ecosystems in their areas. States with very active readiness activities include Oregon, Washington, California, Michigan, Texas, New York, Tennessee, Illinois, Rhode Island, Hawaii, and many others. Cities across the US include San Francisco, Portland, Huston, Austin, Chicago, New York, Nashville, Phoenix/Tucson, and many others. Preparations include creating policies and actions that accelerate plug in readiness through education,

incentives, building codes, zoning ordinances, regulations, deployment of plug in vehicles in their own fleets, building of charging infrastructure and corridors, and establishing partnerships with auto and charging station manufacturers.

Almost all Auto Manufacturers will bring plug in vehicles to market starting this year. Nissan and Chevy will bring the Leaf and Volt to market in Oct/Nov of 2010. The plug in Ford Focus will arrive in 2011. Other manufacturers bringing plug in vehicles to market include Toyota, Mitsubishi, BMW, Audi, VW, Smart, Hyundai, Renault, and others. In addition, smaller manufactures such as Think!, Coda, BYD are bring cars to market. These auto manufacturers are choosing to deploy their vehicles preferentially to areas where significant preparations have been made by the community.

Charging Station Manufacturers are producing charging stations to provide the charging infrastructure needed to charge the vehicles. Capabilities range from a simple plug to full featured units allowing billing of consumers for use of charging stations, ability to monitor electricity costs and Green House Gas reduction, ability to manage fleet electric usage, and ability for drivers to find charging stations.

Full Disclosure Note: The author of this white paper (Larry Kinder, President LilyPad EV) is the distributor of Coulomb Electric Vehicle Charging Stations in Missouri. Coulomb is the leading manufacturer of charging stations.

Electric Utility Companies across the US are now starting to actively get ready for plug in vehicles by establishing pilot programs, deploying charging stations, developing rate structure proposals, and deploying plug in vehicles in their fleets. EPRI, the industry group for shareholder owned electric utilities has established a Plug In Readiness Pledge that many utility companies have signed. Some electric utilities involved in plug in readiness efforts include KCPL, Ameren, Westar, DTE, ComEd, PG&E, CenterPoint, Madison Gas and Electric, PepCo, Progress Energy, Southern Cal Edison, Austin Energy, and many more.

Best Practices:

There are many examples around the country of areas getting ready for plug in vehicles. In fact the Rocky Mountain Institute has an effort called Project Get Ready (www.projectgetready.com) that is acting as a coordinating body to help share best practices and learnings across the US. One of the best examples of a coordinated effort is the Puget Sound Regional Council's report to local governments on how to get ready for plug in vehicles (http://www.psrc.org/assets/4325/EVI_full_report.pdf). Many additional efforts are listed in the appendix.

Best practices include addressing government policies, education, incentives, consumer and fleet demand, deploying charging infrastructure, and other items in a cohesive manner.

See the appendix for links to many activities underway around the country.

Proposal:

This proposal is intended to be the beginning point for discussion rather than an "all or nothing" position. Goal is to accelerate deployment of plug in vehicles and charging station infrastructure.

- Create a Missouri State Plug in Readiness Task Force sponsored by the Governor to build on the efforts of the existing Greater Kansas City and Greater St. Louis Plug-In Readiness Task Forces.
- Provide incentives for purchase of charging stations and plug in vehicles.
- Establish model building codes and zoning ordinances that could be adopted by locally.
- Set targets for deployment of plug in vehicles into state owned fleets.
- Establish voluntary targets for businesses to put EVs in their fleets, subsidize employee purchases, and provide free charging at work for employees.
- Develop partnerships with auto manufactures to deploy vehicles in Missouri.

Resources Needed:

- Appoint a State Task Force Lead
- Secure membership representatives from Governor's office, DNR, DED, DOT, Office of Administration, etc.
- Secure membership from Greater Kansas City and Greater St. Louis Plug-In Readiness Task forces, as well as representatives from other population centers such as Springfield, Jefferson City/Columbia/Rolla area, etc.
- Allocate funding for both operation of the State Task Force as well as some of the implementation. Amount to be determined and requested by the task force.
- Secure commitment from business partners to participate. LilyPad EV would like to participate.

Summary:

By building on efforts already underway both within Missouri and in other areas, Missouri can accelerate the deployment of plug in vehicles in the state……leading to an enhanced economy, more jobs, more businesses, cleaner air, and energy security.

APPENDIX

LINKS TO RELEVANT INFORMATION

Market Info

- 1.9M jobs within 20 years
  http://www.greenchipstocks.com/articles/electric-car-benefits/806
- Other Economic benefits
  http://www.greencarcongress.com/2010/04/ecimpact-20100409.html
- Pike Research 1M charging stations to be installed in us by 2015
  http://www.pikeresearch.com/research/electric-vehicle-charging-equipment
- Verify Markets - charging station market to be $3.1B by 2017
  http://www.verifymarkets.com/NA_Electric_Vehicle_Charging_to_Reach_3.1_billion_by_2017.html
- Long list of plug in vehicles http://www.pluginamerica.org/vehicles/

Links to efforts in other areas

- Project Get Ready http://projectgetready.com/category/city
- The EV Project www.the evproject.com
- EV Roadmap, Portland www.evroadmap.com
- ChargePoint America www.chargepointamerica.com
- Washington State http://www.commerce.wa.gov/site/1342/default.aspx
- Puget Sound Overview http://www.psrc.org/transportation/ev/model-guidance
- Michigan Plug In Task Force http://detnews.com/article/20100927/BIZ/9270398/1001/rss21
- Vancouver http://vancouver.ca/sustainability/electric_vehicles.htm
- Indiana http://www.insideindianabusiness.com/newsitem.asp?ID=43540
- Denver www.projectgetready.com/city/partner-city/greater-denver-colorado
- Kansas City Plug In Task Force http://kcenergy.org/pluginreadykc.aspx
- CT Governor's Task Force http://www.ct.gov/dpuc/cwp/view.asp?a=3856&q=452086

Industry Associations

- Electrification Coalition www.electrificationcoalition.org
- Electric Drive Transportation www.electricdrive.org